Integrated
Cranberry Crop
Management
for Wisconsin

Cranberry

Crop Management Newsletter

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Contents:

Upright Dieback

Upright dieback is a poorly understood disease complex that can cause significant damage to new or established cranberry beds. It is called a "disease complex" because it may be caused by a combination of different fungi and environmental conditions that are poorly understood. In Wisconsin, *Phomopsis vaccinii* (also called *Diaporthe vaccinii*) is apparently the major fungal species involved in upright dieback. *P. vaccinii* is also the cause of viscid rot, a soft rot of fruit. Viscid rot is generally considered a minor post-harvest disease that affects fruit in storage, but it occasionally appears in the field in Wisconsin. Of course, many problems other than fungi can cause uprights to die back. Symptoms of Phomopsis upright dieback show up in mid to late summer. If vines looked good at the time of harvest but look bad in spring, Phomopsis is probably *not* the problem.

Symptoms. Diseased uprights initially are mottled or show general yellowing, with symptoms starting at the tip and progressing to the base. Later, uprights may turn orange-bronze before they eventually turn brown and die. Diseased uprights are dispersed among healthy vines and may be adjacent to apparently healthy uprights on the same runner. This scattered distribution of disease among healthy uprights gives the cranberry planting a "salt and pepper" appearance. In general, large dead patches of uprights are not the result of upright dieback caused by *P. vaccinii*, but are caused by various factors including standing water, winter injury, misapplication of chemicals, or weed competition.

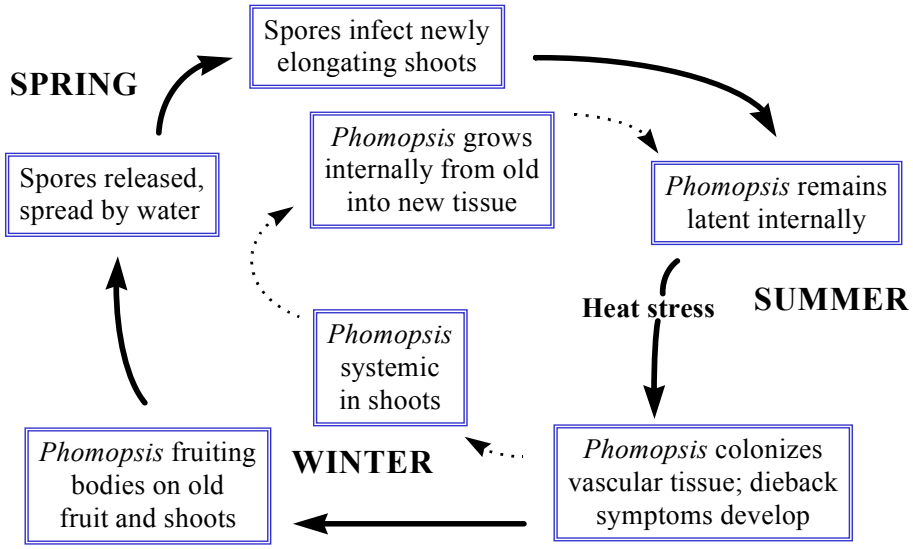
Disease Cycle. Although *P. vaccinii* is frequently associated with upright dieback, the disease cycles upright dieback and viscid rot are not fully understood. However, based on when and where *Phomopsis* is detected on vines, when symptoms appear, and when chemical control seems to work best, a disease cycle is proposed as follows.

Phomopsis overwinters in the form of fungal fruiting bodies on old fruit (viscid rot) and dead shoots. To a lesser extent, it may overwinter internally in dormant

vines. In the spring, spores ooze out of the fruiting bodies and are spread by rain and irrigation water to newly elongating, succulent shoots. Exactly where on the new tissue infection occurs is not known, but chemical control has been most effective when shoots show about ½ inch of new growth. *Phomopsis* that overwintered in vines may grow internally into new tissue. After new growth is invaded, infections remain latent (dormant) for several weeks.

During this period, *Phomopsis* can be isolated from healthy-looking vines. Later in the summer, as vines become stressed from heat and the burden of bearing fruit, *Phomopsis* becomes active and colonizes vascular tissue. As the food- and water-conducting tissues are invaded, uprights turn yellow and eventually die back. During fall, the fungus forms fruiting bodies on dead tissues where it overwinters.

Upright Dieback--Proposed Disease Cycle



Solid arrows indicate the predominate cycle; broken arrows indicate a possible alternative cycle.

Control

Practices that minimize heat and drought stress, and encourage vigorous but not rank vine growth, should minimize the incidence and severity of upright dieback and viscid rot. When establishing a new planting, obtain vines from a source with little or no history of upright dieback or viscid rot. Fungicide performance has been inconsistent, but application of Bravo (chlorothalonil) when shoots are about ½ inch long is probably the best time for preventing upright dieback. By bloom and later, fungicides will not control upright dieback. By this time the fungus has apparently invaded shoots and is out of reach of fungicides. Bravo

has a regular label for use during bloom and fruit set, but you must have the current 24C Special Local Needs label if you want to use it prior to bloom for control of upright dieback. The "current" label is the same one as last year, with Jan. 25, 2005 listed as the expiration date. Call the WSCGA office (715-423-2070) or Patty McManus (608-265-2047) if you need a 24C label for chlorothalonil.

Patty McManus, UW-Madison Extension Plant Pathologist

Changes in Orbit Label

Growers who plan on using Orbit for cottonball control this year are reminded that the **2003 Section 18 label permits a maximum of <u>two</u> sprays before July 31, rather than the four permitted in previous years.** Other use patterns are similar to past years. Abound (azoxystrobin) is now registered, but it may not be applied before bloom. This may be our last year for using Orbit, with cottonball control dependent on Abound and other fungicides in the future.

Patty McManus, UW-Madison Extension Plant Pathologist

The day people stop bringing you their problems is the day you have stopped leading them.

Colin Powell

Worrying is less work that doing something to fix the worry. Everybody wants to save the earth; nobody wants to help Mom with the dishes

P.J. O'Rourke

Phosphorus Fixation in Soil

Each year growers make applications of phosphorus containing fertilizers to supply plants with nutrients they require. What happens to that fertilizer once it reaches the soil surface? This article will seek to explain the process in language growers can use.

The need to add P fertilizer arises from the inability of soils to supply adequate amounts of orthophosphate ($H_2PO_4^-$ and HPO_4^{2-}) for satisfactory crop growth. The reactions that P undergoes in soils are fundamentally different than for N or K and result in poor (25% or less) efficiency of recovery in a given year. In contrast uptake of N or K fertilizer may be as high as 80%

Fertilizers used by cranberry growers can contain phosphorus in one of four different formulations: Triple superphosphate, regular superphosphate, monoammonium phosphate, or diammonium phosphate. In order for a plant root to take up a phosphate ion it must be in the soil solution (liquid fraction of the soil). It cannot be bonded to any other ion.

When fertilizer containing P is applied to soil it goes through a sequence of reactions that are generalized into three components: 1) dissolution of the P fertilizer particle, 2) precipitation reactions, and 3) adsorption reactions.

Dissolution of the particle

Dry granular fertilizers must react with water to dissolve. Because the granules are concentrated salts, they attract water from the surrounding environment, including the air. As

water reacts with the granules they dissolve and create a concentrated solution of the fertilizer that moves into the surrounding soil. Irrigation or rainfall hasten dissolution of the granules and movement into the soil.

Precipitation reactions

As the P dissolves from the granule it is present as a negatively charged phosphate ion ($H_2PO_4^-$). This negatively charged ion (anion) is very reactive with positively charged ions (cations) such as iron (Fe^{++}), Aluminum (Al^{++}), Manganese (Mn^{++}), or Magnesium (Mg^{++}). Added phosphate reacts almost immediately with cations to form relatively insoluble compounds. These compounds are not completely insoluble in water, but they are poorly soluble. Acid soils fix more P than neutral soils because as soil pH drops iron and aluminum ions become more available.

These are called precipitation reactions because as these compounds form they also aggregate and will settle out in a container of water.

As plants or other reactions remove P from the soil solution P is released from these compounds until equilibrium is reached. Unfortunately, P is not released into the soil solution nearly as quickly as plants can take P out of the soil solution.

Adsorption reactions

These relatively insoluble compounds can also react with the mineral fraction of the soil. Once the P combines with iron, aluminum, managanese, etc. and adsorbs to the soil minerals its solubility declines further.

As a result of these reactions P fertilizer that is applied to soils becomes plant unavailable fairly quickly—a few hours to a few days. While the total amount of P in the soil may increase over time, plant available P remains low and relatively constant.

Is all soil P available to plants?

The simple answer is no. Inorganic P in soils is found in three fractions: in solution, exchangeable, and insoluble. Only the P in solution is plant available. As this P is taken up from the soil solution it is replaced by P coming from the exchangeable pool of P (Fig 1).

The rate of release from the insoluble pool is very slow, too slow to contribute significantly to crop growth over a growing season. Thus, the P available to a crop is that which is capable of dissolution of the growing season. This is usually only a small fraction of the total P in the soil. Fertilizer P is generally more available for crop growth than soil P.

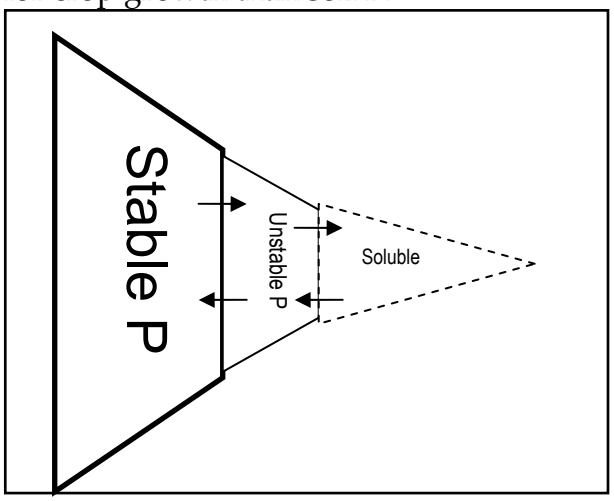


Figure 1. Relative amounts of P in the three pools available in soils. P can move from one pool to another, but moves very slowly.

One of the unique characteristics of P is its immobility in soil. P ions do not leach, as do nitrate or potassium ions, even in sandy soils. Thus P moves very slowly in soils and it is difficult to move P into the root zone without some sort of tillage. In perennial cropping situations, like cranberry, it is extremely important to add P fertilizer to the soil pre-plant.

So what does this mean for cranberry producers? Because P is tied up and made plant unavailable in the soil relatively quickly frequency of P application may be more important than the total amount of P applied.

Chemical soil testing is supposed to only extract the P that is the soil solution and, therefore, plant available. Existing soil tests extract too much P from cranberry soils, thus overestimating the plant available P. That is why your soil test may show that the soil has excessive P, but your vines may be low to barely sufficient. This underscores the importance of tissue testing as opposed to soil testing.

While P is critical to cranberry growth and production, it is typically also the limiting factor for algae growth in surface waters. When P leaves cranberry properties it can be a substantial environmental pollutant. Being conservative in applications of P fertilizer will save input costs and will help to protect the environment.

Teryl Roper, UW-Madison Extension Horticulturist

Politics is supposed to be the second oldest profession. I have come to realize that is bears a very close resemblance to the first

Ronald Reagan

Phosphorus fertilizer

Much has been written about the use of phosphorus fertilizers for cranberry production. Earlier this year the cranberry mineral nutrition research group met to discuss information we had about cranberry mineral nutrition and to discuss recommendations that we might make.

Based on research data on the effect of P fertilizer on yield we are recommending that cranberry growers use fertilizers with an N:P ratio of no more than 1:2.

The commonly used fertilizer 6-24-24 has an N:P ratio of 1:4 suggesting that it provides too much P in relationship to the amount of N. A fertilizer like 9-18-24, on the other hand, has a ratio of 1:2 and should provide enough P in relationship to N. A fertilizer such as 10-10-10 or 14-14-14 would also be acceptable.

Based on research results, we believe that if cranberry growers will reduce the amount of P fertilizer they use yields will not drop IF, 1) at least 45 lbs P_2O_5 are applied per acre and 2) the number of fertilizer applications remains the same or increases.

Teryl Roper, UW-Madison Extension Horticulturist

Go, little book, and wish to all
Flowers in the garden, meat in the hall,
A bin of wine, a spice of wit,
A house with lawns enclosing it,
A living river by the door,
A nightingale in the sycamore!

Robert Louis Stevenson

Informal Cranberry Meetings

Wisconsin cranberry growers are invited to attend one of two informal, on-farm meetings. We'll hear from University Extension Specialists, discuss questions and issues, and enjoy friendships. Bring samples. Ask questions. Troubleshoot. Stump the "experts". Put these dates on your calendar and attend a session that is close for you.

Monday June 9
3:00 to 5:00 pm

Beltz Cranberry Company
Warrens

Host: Steve Gephardt

Directions: Go north on Augusta Road from CTH EW east of Warrens.

Wednesday June 11
10:00 am to 12:00 noon

Bartling's Manitowish Cranberry Company
Manitowish Waters

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